APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,525	07/10/2003	Mark Robert Funk	ROC920020205US1	1216

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EXAMINER
RUTTEN, JAMES D

ART UNIT	PAPER NUMBER
2192	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/616,525	FUNK ET AL.
	Examiner	**Art Unit**	
	J. Derek Rutten	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>03 July 2007</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-11,13 and 14* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-11,13 and 14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/19/07 has been entered.

2.   This action is in response to Applicant's submission filed 6/19/07, as well as Applicant's supplemental submission filed 7/3/07, responding to the 5/31/07 Office action which detailed the rejection of claims 1-14. Claims 1, 6 and 11 have been amended, and claims 3 and 12 have been canceled.

3.   It is noted that in the listing of claims on pages 2-7 of the submission filed 6/19/07, claims 2, 9, and 14 are listed with a status identifier "currently amended." These claims do not appear to comply with 37 CFR § 1.121(c) since there are no associated claim markings. However, Applicant's 7/3/07 submission corrects this by properly indicating these claims as "previously presented." The 7/3/07 submission complies with 37 CFR § 1.121(c). Claims 1, 2, 4-11, 13, and 14 remain pending in the application and have been fully considered by the examiner.

Response to Amendments/Arguments

4.   Applicants' arguments filed 7/3/07 have been fully considered but they are not

persuasive. Applicants' arguments (especially pages 12-15, 7/3/07) fail to comply with 37

CFR 1.111(b) because they amount to a general allegation that the claims define a patentable

invention without specifically pointing out how the language of the claims patentably

distinguishes them from the references. The arguments essentially recount each element of the

independent claims and simply allege that the combined prior art does not teach or disclose any

of the elements. The presented arguments do not *specifically* point out *how* the language of the

claims distinguishes them from the references. Therefore, Applicants' arguments are not

persuasive.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

6.   Claims 1-6 and 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over prior

art of record "Differential Effective Lapse Time Accumulator (Delta)" by Bickle et al.

(hereinafter "Bickle") in view of prior art of record "How Debuggers Work" by Rosenberg

(hereinafter "Rosenberg") in view of prior art of record U.S. Patent 5,657,253 to Dreyer et al.

(hereinafter "Dreyer")

In regard to claim 1, Bickle discloses:

A method for implementing breakpoint based performance measurement using a set of hardware counters for counting hardware events See page 1, e.g. "time/counter cards 24"; *said hardware counters being programmable for counting predefined ... processor events* See page 1 e.g. "measurement of system performance"; *said predefined ... processor events including processor cycles ...* See page 1, e.g. "instruction cycle time measurement"; Bickle does not expressly disclose: *programmable processor events including ... cache misses.* However, Dreyer teaches that events are programmable, and include cache misses. See column 3 lines 52-65, e.g. "programmable event counters" also "cache miss rates."

inserting a start breakpoint instruction and a stop breakpoint instruction...; See Bickle middle of page 1, e.g. "start breakpoint A and stop breakpoint B"; Bickle does not expressly disclose: inserting breakpoint *instructions...in hardware instructions.* However, Rosenberg teaches that breakpoints can be implements as hardware instructions. See bottom of page 40, e.g. "special instruction". Bickle does not expressly disclose *executing said hardware instructions and suspending processing of said hardware instructions responsive to executing said start breakpoint instruction;* However, Rosenberg teaches that upon encountering a "special instruction," execution is suspended while an operating system notifies a debugger. See bottom of page 40.

responsive to executing said start breakpoint instruction generating a processor interrupt...; See page 1 line 21, e.g. "The A comparator 18 is used as a start timing breakpoint..." Comparators are used to provide a signal (i.e. interrupt) to the

accumulator. Bickle does not expressly disclose *for entering interrupt handler instructions and calling breakpoint instructions;* However, Rosenberg teaches that upon encountering a "special instruction," a trap to the operating system is called which notifies a debugger, i.e. "breakpoint instructions". See bottom of page 40. Note that the limitation "calling breakpoint instructions" is broadly interpreted according to the description providing enablement on page 4 lines 11-21 which describes a "debugger."

...*starting said defined set of hardware counters;* See page 1 lines 26-27, e.g. "accumulate elapsed time"; Bickle does not expressly disclose *said [breakpoint manager] generating a start processing instruction to return processing from said interrupt handler instructions to the hardware instructions..., responsive to said generated start processing instruction;* However, Rosenberg teaches that a debugger handles a breakpoint before returning execution. See page 41 lines 16-17, e.g. "proceed past this breakpoint." Further, see "Algorithm 3.1 appearing on page 42, e.g. "run debuggee full speed."

executing the hardware instructions and ...and stopping said defined set of hardware counters, responsive to executing said end breakpoint instruction. See page 1 lines 22-23, e.g. "B comparator 18 is used as a stop timing breakpoint." Bickle does not expressly disclose *suspending processing of the hardware instructions.* As pointed out above, Rosenberg teaches breakpoint handling by suspending processing. See bottom of page 4, e.g. "trap to the operating system."

providing a debugger breakpoint manager including a performance measurement program and a user interface, and enabling a user to specify a start bound and an end

bound of a performance collection region of a user source code and said set of hardware

counters. See page 1 lines 33-35. Here, Bickle's "operator interface" coordinates with

the test tool to display performance results, and at least provides a breakpoint manager

where users can enter breakpoint parameters (including start and end bounds provided by

the A and B comparators– see lines 21-23). These breakpoint parameters control the

region over which the hardware counters (i.e. input timer/counter cards) operate.

It would have been obvious to one of ordinary skill in the art at the time the

invention was made to use Dreyer's programmable counter with Bickle's event counting

in order to monitor particular aspects of processor performance as suggested by Dreyer

(see column 3 lines 60-65). Further, it would have been obvious to one of ordinary skill

in the art at the time the invention was made to use Rosenberg's method of breakpoint

handling with Bickle's breakpoints in order to provide control over the execution of a

debuggee (see Rosenberg page 39 paragraph 1).

In regard to claim 2, the above rejection of claim 1 is incorporated. Bickle further

discloses: *wherein said predefined processor events further include at least one of*

processor instructions executed, a defined type of processor instruction executed, and

translation lookaside buffer misses. See page 1 lines 28-29, e.g. "number of times

breakpoint A occurs." Note that the phrase "at least one of..." permits the disclosure of

one item to meet the language of the claim.

In regard to claim 4, the above rejection of claim 1 is incorporated. Bickle further discloses: *wherein the inserting step includes inserting said start breakpoint instruction and said stop breakpoint instruction at arbitrary user defined locations ....* See page 1 line 34, e.g. "breakpoint ... parameters." Bickle does not expressly disclose *in said hardware instructions.* However, Rosenberg teaches that breakpoints are inserted in hardware instructions. See page 41 lines 5-6. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Rosenberg's method of breakpoint handling with Bickle's breakpoints in order to provide control over the execution of a debuggee (see Rosenberg page 39 paragraph 1).

In regard to claim 5, the above rejection of claim 1 is incorporated. Bickle further discloses: *a user.* See page 1 line 1, e.g. "user." Bickle does not expressly disclose: *enabling ... to interrogate a program state and to request said start processing instruction.* However, Rosenberg teaches that a debugger interrogates program state and enables a return to program processing. See page 41 lines 13-20. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Rosenberg's method of breakpoint handling with Bickle's breakpoints in order to provide control over the execution of a debuggee (see Rosenberg page 39 paragraph 1).

In regard to claim 6, Bickle discloses:

Apparatus for implementing breakpoint based performance measurement See page 1 lines 13-18, e.g. "DELTA system."

...*a breakpoint manager;* See page 1 lines 31-35. Here, the "operator interface" shows the existence of a breakpoint manager. That is, the breakpoint manager operates to manage breakpoints using input provided by the operator interface.

said breakpoint manager utilizing said performance measurement program and said user interface for defining a set of said hardware counters for counting user specified hardware events See page 1, lines 1-3, e.g. "allows the user to take accurate time measurements" and "count the number of times." Also lines 33-35, e.g. "operator interface."

user program means See page 1 line 1, e.g. "test tool."

Bickle does not expressly disclose: *a source level debugger including a breakpoint manager;* However, Rosenberg teaches that a source level debugger (see page 4 line 2, e.g. "source-level debugger") is used to manage breakpoints (see page 5, 3rd paragraph , e.g. "Current debuggers can control all execution ... by using breakpoints"). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Rosenberg's debugger with Bickle's breakpoints in order to provide control over the execution of a debuggee (see Rosenberg page 5 paragraph 3).

All further limitations have been addressed in the above rejection of claim 1.

In regard to claim 8, the above rejection of claim 6 is incorporated. Bickle further discloses: *wherein said breakpoint manager ... records user information specifying said defined set of hardware counters.* See page 1 lines 33-35. Bickle does not expressly disclose *responsive to said start breakpoint instruction.* However, Rosenberg teaches

that information can be recorded responsive to a breakpoint. See page 41 lines 13-16. It

would have been obvious to one of ordinary skill in the art at the time the invention was

made to use Rosenberg's information recording with Bickle's user information in order to

give a programmer fine control over a program (see Rosenberg, top of page 3).

In regard to claims 9 and 10, the above rejection of claim 6 is incorporated. All

further limitations have been addressed in the above rejection of claims 2 and 4,

respectively.

In regard to claim 11, Bickle discloses a computer program product. See page 1

line 1, e.g. "DELTA is a test tool." All further limitations have been addressed in the

above rejection of claim 1.

In regard to claims 13-14, the above rejection of claim 11 is incorporated. All

further limitations have been addressed in the above rejection of claims 4 and 2,

respectively.

7.   Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bickle, Rosenberg,

and Dreyer as applied to claim 6 above, and further in view of U.S. Patent No. 5,533,192 to

Hawley et al. (hereinafter "Hawley").

In regard to claim 7, the above rejection of claim 6 is incorporated. Bickle further

discloses: *specifying said defined set of hardware counters*. See page 1 lines 25-29.

Bickle, Rosenberg, and Dreyer do not expressly disclose *wherein start breakpoint*

instruction includes encoded information. However, Hawley teaches that breakpoints are

encoded to indicate the type of breakpoint as well as the identity of the desired debugger. See column 9 lines 24-28. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Hawley's teaching of breakpoint encoding with Bickle's hardware counters in order to provide more than one debugger operative at a time (see Hawley column 5 lines 40-42).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to J. Derek Rutten whose telephone number is (571)272-3703. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571)272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. Derek Rutten/
Patent Examiner, Art Unit 2192